

6.0 EMERGENCY PREPAREDNESS AND PLANNING

Astrotech has a written emergency plan that covers emergency response actions for incidents that may require action by emergency responders including medical and fire personnel and evacuation of buildings and nearby areas. This plan was updated in 1988 and is supported by other Astrotech

documents.^{1,2}

In the Titusville area, emergency planning and response capabilities benefit from the planning and working relationship between the City of Titusville and Brevard County. The officials have worked together during other activities requiring public safety duties, specifically the responsibility for thousands of spectators and visitors that are present in the area before, during and immediately following space launches.

Astrotech takes its safety responsibility seriously as evidenced by its concern for safety design features during facility construction and modification as well as its safety record to date. Astrotech has never had a major spill or a release of toxic vapors from its facility, so the alerting of emergency response agencies has never been necessary. On one occasion in connection with sampling anhydrous hydrazine during the fueling of a satellite, less than a teaspoon of liquid was spilled. The tank and scrubber systems totally contained this small spill. Even though no notification was required, Astrotech reported the incident to local officials.

6.1 Emergency Response Equipment and Personnel

Astrotech officials are extremely knowledgeable in the use of and requirements for safety equipment. The facility is designed with ready access to personal protection and fire prevention equipment. For an overview of emergency equipment available in Building 2, see Exhibit 6-1. Local and county emergency responders are nearby and, as detailed below, experienced in the operations and materials handled at the facility.

6.1.1 Personnel Protection and Medical Response

Astrotech has provided personal protection and safety equipment up through Level A for use by those who work in the hazardous operations area. This equipment is also available, if needed, for emergency response personnel. See Section 4.4.3. Astrotech has also supplied PPE to emergency response personnel from both the city fire department and the county specialized response team.

¹ Safety Standard Operating Documents, Astrotech Space Operations, L.P., 1988.

² Safety Policy, Astrotech International Corporation, 1988.

EXHIBIT 6-1 BUILDING 2 EMERGENCY EQUIPMENT

EQUIPMENT	LOCATION	CAPABILITIES
Scott Air Packs (2)	South Control Room	30 Minute SCBA
ISI Ranger Air Packs (2)	Hallway by Spill Response Equipment	30 Minute SCBA with Airline QD
Splash Coveralls (20)	Balance Machine Control Room	Chemical Resistant Suits
Level A Airline Hazmat Suits (6)	Balance Machine Control Room	Encapsulated Fullbody Chemical Resistant
Level A SCBA Hazmat Suits (4)	Balance Machine Control Room	Encapsulated Fullbody Chemical Resistant
Disposable Nitrile Gloves (12dz)	Balance Machine Control Room	Chemical Resistant Wide Range Application
ISI Full Face Pressure Demand Airline with 5 Min. Escape	Balance Machine Control Room	ISI Airline System for Extended Hazardous Operations
Emergency Life Support Apparatus (ELSA) (6)	North & South Bays	5 Minute Emergency Escape Units
MDA TLD-1 Monitors (4)	Placed in Areas Containing N ₂ H ₄ , MMH, & N ₂ O ₄	Continuous Monitoring System that Alarms Locally and at Guard House
Spill Control Station	Hallway	Contains 2 Tyvek Total Body Coveralls, 2 Splash Goggles & Gloves, Sorbent Pads, 15 Polyzorb Spill Control Pillows and Disposable Bags
95 Gallon Poly-Overpack Drums	Fuel Cart Room	Twist Top Salvage Drum
Drum Repair Kit	Hallway by Spill Response Equipment	Repair of Most Common Container Leaks, Contains Barrier Tape
Absorbent Booms and Dam Kit	Fuel Cart Room	Spill Control
Emergency First Aid Kit	Balance Machine Control Room	Emergency First Aid Trauma Kit, O ₂
Open Top Drums (2)	Cart Rooms, 1 Each	Contaminated Materials, Rags, Booms. 20 Gallon Capacity x 2
Wilden Pump (2)	Mechanical Room	Pneumatic Diaphragm Pump, 60 GPM Capacity
Drum Skid (1)	Scrubber Pad	4 Drums
Water Broom	Fuel Cart Room	35 psi Water Outlet to Wash Down Spill Areas

Should emergency medical attention be needed, the plant has emergency medical technicians on site during liquid propellant operations. Injured individuals requiring additional medical attention would be transported to the Jess Parrish Hospital in Titusville, where the staff has been trained to deal with the types of injuries that could occur at the Astrotech facility.

6.1.2 Fire Protection Equipment and Personnel

Astrotech relies upon an automatic sprinkler system (both dry and wet pipe) activated by heat/smoke detectors located throughout the facility. See Section 4.4.4. Additional facility fire protection equipment includes portable fire extinguishers, both halon and dry chemical types. The facility has fire hydrants placed at strategic locations that would be used by public responders.

In the event of a fire in Building 2, an automatic dialer, triggered by activated smoke/heat detectors, calls the Titusville Fire Department. Additional available response personnel include the Brevard County Fire Department Station # 22, located approximately 2¼ miles or 5 minutes away, and the county hazardous materials specialized response team (SRT) based approximately 20 miles or 25 to 30 minutes from Astrotech. On Exhibit 6-2, the locations of fire stations are indicated; the SRT is not on the map. All emergency access routes are over publicly maintained roads.

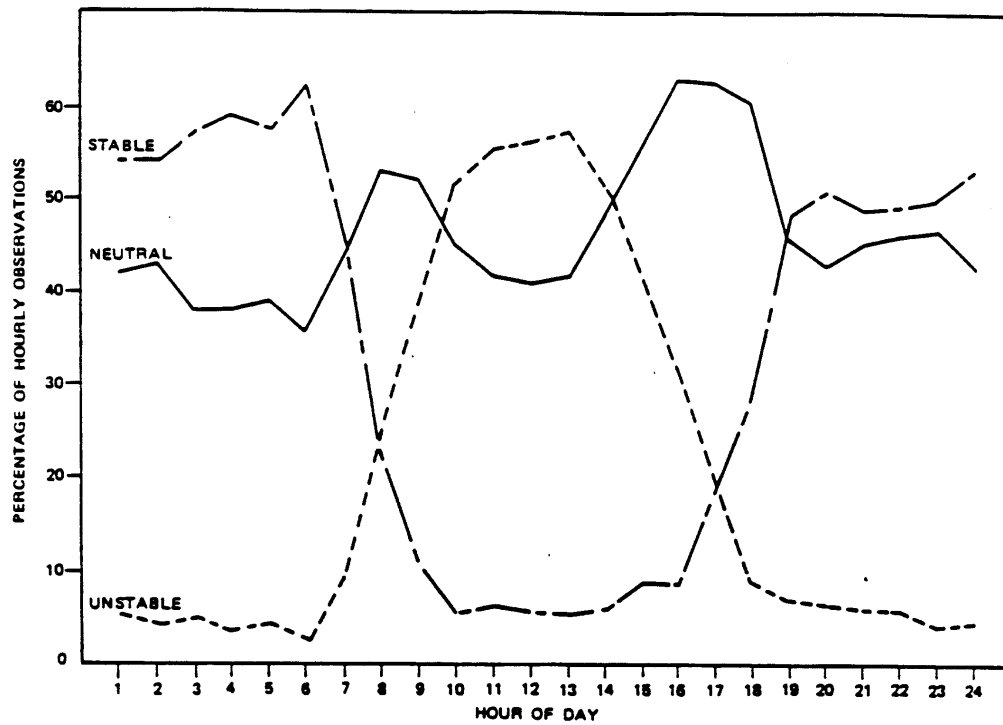
The Brevard County SRT is an experienced hazardous materials response unit that is well trained and equipped. This team has a large hazardous materials response and communications van that can serve as a command post. This team responds to approximately 50 hazardous materials calls per month, but as noted earlier, has never needed to respond to an incident at Astrotech.

6.1.3 Familiarity of Emergency Responders with Facility

The Astrotech Safety Officer, named by the company as emergency response coordinator, has made the facility emergency plan available to local planning officials and has fully cooperated with emergency planning and response leaders in on-site explanations of the company's hazardous materials operations. Members of the county SRT and county emergency medical technicians have been invited to and have attended satellite fueling operations. Additionally, the Titusville Fire Department has been invited to Astrotech for familiarization with and training in the fire control system at the plant. Various types of PPE have been donated to the county SRT by Astrotech.

Coordination between Astrotech and emergency responders began even before the facility was built. Local fire, building and planning staff, and NASA officials were consulted during design and construction phases of the facility and their recommendations were solicited, many of which were incorporated into the facility.

EXHIBIT 6-2 LOCATIONS OF EMERGENCY RESPONDERS



The Brevard County emergency management agency has a staff person, who is fully aware of hazards at the facility, assigned to deal with distributing public information. Public information regarding the Astrotech operation is generally disseminated from the Astrotech Maryland office. However, the general manager at the facility is assigned to work directly with Brevard County emergency management to furnish emergency information should there be a release.

6.2 Emergency Response Communications

Astrotech procedures require that when propellants are on-site, a senior spacecraft propulsion engineer must be available in the local area and on call twenty-four hours each day.

The key person in both emergency planning and response for Astrotech is the Safety Officer. He continuously observes all hazardous operations through the explosion-proof window in the control room and ensures compliance with approved procedures. He is also involved in the transportation of fueled satellites from Astrotech to KSC. When he is away from the facility, he is available through pager and cellular telephone.

Astrotech considers a spill of hydrazines or nitrogen tetroxide in excess of one gallon to be an uncontrolled release.³ Should such a spill occur during working hours, the procedures states that a call for outside assistance be made by the Safety Officer using the emergency telephone number 911.

Should conditions preclude this action by the Safety Officer, procedures are in place for any workman involved to contact the front gate guard who would then report the accident to public authorities, also by dialing 911. Under such circumstances, the following information concerning the spill would be furnished to the front gate guard:⁴

1. Exact location
2. Estimated quantity
3. Time and duration
4. Media or medium into which the release occurred
5. Direction of vapor movement if release is outside of the Building 2⁵
6. Number of personnel involved.

Also, the guard house would be alerted of problems by the alarm system as described in Section 4.4.4.

Astrotech's emergency response plan has a roster for contacting and calling to duty critical response personnel when they are off duty. The roster lists the names and pager numbers of the Safety Officer and the deputy general manager and the telephone numbers of three response team members. All Astrotech employees have in their possession a card listing telephone numbers of these and additional plant personnel considered critical in emergencies.

³ Spills of that amount of fuel could bring the vapor concentration level in the bay to the lower explosive limit for hydrazine.

⁴ Emergency Spill Response Plan, Astrotech Space Operations, L.P., 1988.

⁵ A wind sock is located near the hazardous materials working and storage area to identify wind direction should evacuation become necessary.

Should an incident occur at night or when Astrotech is not in operation, the front gate guard, after calling 911, would contact the Safety Officer, the vice president and the general manager.

Procedures for inter-communication and coordination of company response operations are in place. Astrotech has a close-knit staff of eleven individuals, many with long tenure. Contractors servicing satellites bring with them only four to eight persons involved in handling propellants, so the total number of individuals in Building 2 during propellant operations is small. Astrotech has a plant-wide telephone system and has posted the number of the front gate guard by each telephone. There is an intercom system in the spacecraft processing areas, including communications capability to and from personnel working in full protective clothing. Eight of Astrotech's eleven employees have one-watt portable radios with plant wide coverage. One radio is maintained at the desk of the administrative assistant in the administration building.

6.3 Emergency Response Planning

6.3.1 Brevard County Hazards Analysis Study

The Brevard County Emergency Management Agency has performed hazards analyses (including risk and vulnerability analyses) for the Astrotech facility as detailed in the EPA guidance document for emergency planning⁶ under SARA Title III. The results showed that there was "very slight" possibility of release of anhydrous hydrazine or monomethyl hydrazine from this facility; that state-of-the-art containment, scrubber and neutralization systems are in-place to deal with any problems; that the training and safety program at the facility is "excellent"; and that the emergency response program is "comprehensive."

The results of the analyses of releases for these chemicals, including maps of the identified EPA vulnerable zones, are presented in Appendix A. The analysis is based on an release scenario where the maximum quantity of fuel allowed on-site by the Florida DER air permit, is instantaneously released outside the building. County emergency officials stated that they view this scenario to be unrealistic given Astrotech's transport and operating procedures, and believe that a more realistic, but still unlikely accident scenario would be a release initiated within the building with exposure confined to the facility and its immediate vicinity.

6.3.2 Building and Area Evacuation

In the event that a spill in excess of one gallon occurs in Building 2, all personnel would evacuate the building through designated evacuation routes. See Exhibit 6-3 for these routes. Portable emergency life support apparatus, if needed for emergency egress, is readily available in hazardous operations areas. The affected area would be secured, outside help would be called as detailed above and a command post would be established at a pre-determined point based on location of the exposed area and the wind direction. Before evacuation, control room personnel would turn off all power to the building including the scrubber, and therefore all vapors would be contained within the building, unless there was a fire or explosion.

Astrotech continuously monitors vapor concentrations in the interior of

⁶ Technical Guidance for Hazards Analysis, Emergency Planning for Extremely Hazardous Substances, U.S. Environmental Protection Agency/Federal Emergency Management Agency/U.S. Department of Transportation, December 1987.

the building when liquid propellants are present. However, they have no fixed monitoring around the perimeter of their property. Should an internal release occur as described above, portable monitoring equipment would be used to measure ambient vapor concentrations. From information thus obtained, Astrotech officials would evaluate any toxic vapor levels and determine safe areas.

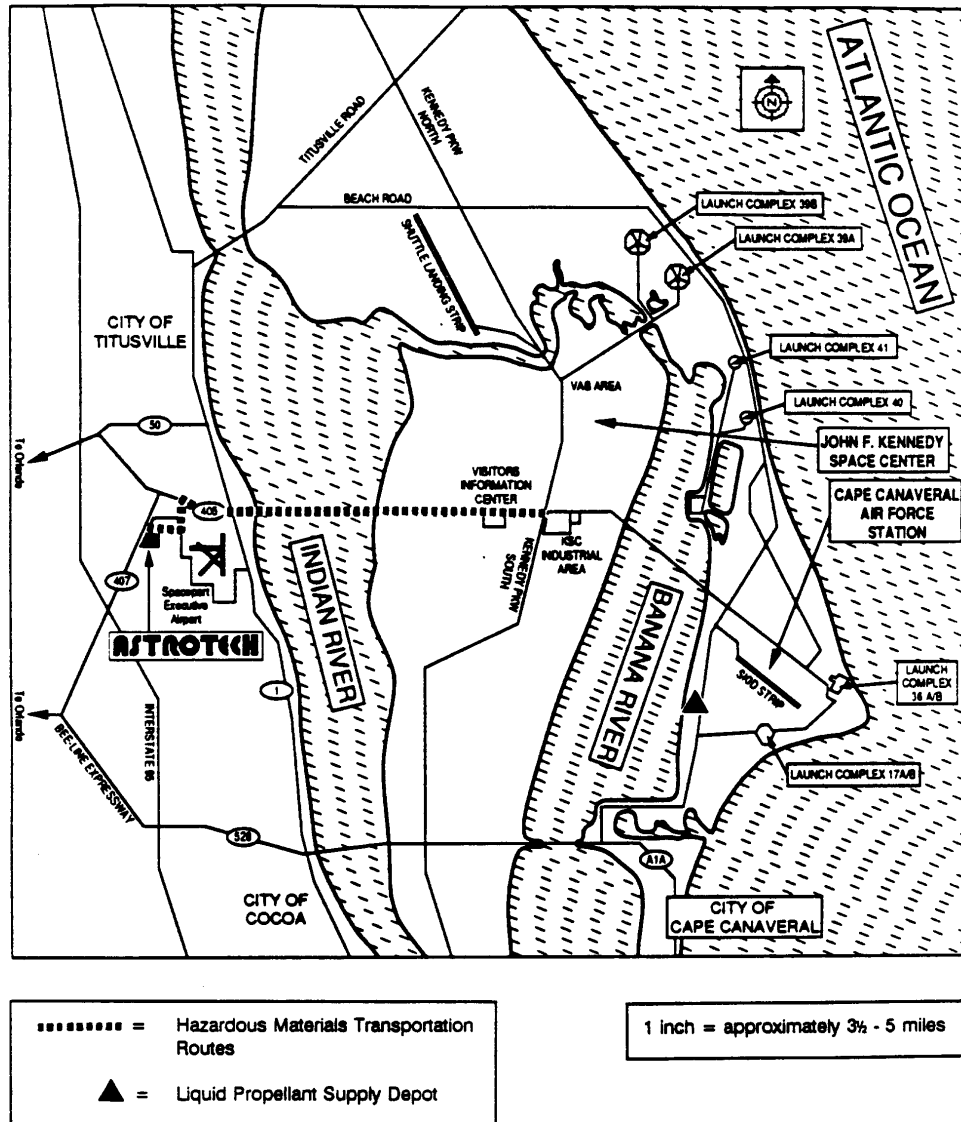
Brevard County has provisions for evacuation of areas surrounding the facility, if necessary. Should there be a release at Astrotech potentially affecting an off-site population, alerting and evacuation would be effected by public safety agencies through door-to-door contact, supported by emergency broadcasts using pre-determined radio stations. There is no public alerting device at Astrotech. Neither does the city of Titusville have a public alerting system maintained in the area surrounding the Astrotech facility.

No formal exercises of the emergency plan involving local emergency response agencies have been conducted, but the plan has been distributed and reviewed with the local fire department, the county SRT and emergency agency heads. The absence of a simulation exercise has been due to logistical problems in scheduling such an exercise with local agencies. Both local emergency management agencies and Astrotech stated that they view conducting the exercise as a high priority.

6.4 Title III Reporting

In 1986, SARA Title III, also known as the Emergency Planning and Community Right to Know Act (EPCRA) of 1986, was enacted so that local government could become aware of inventories of potentially hazardous chemicals and could plan with the facility to protect the public should a release occur. Under Section 302 (a) of SARA Title III, chemicals that are acute toxics are listed as Extremely Hazardous Substances (EHSs). The list contains three hundred and sixty substances, including commonly used chemicals

EXHIBIT 6-3 EVACUATION PLAN FOR BUILDING 2



such as ammonia and chlorine. For each listed chemical, a planning threshold is identified, and any facility having an amount on site at or above that level must report its presence to the state, LEPC and fire department(s) serving the facility. Additionally, SARA Title III identifies reportable quantities for each EHS. If a release at or above the reportable quantity extends beyond the facility boundary, the owner or operator must report the release to local government officials and to the State Emergency Response Committee (SERC).

Monomethyl hydrazine (Chemical Abstracts Number [CAS #] 60-34-4) and anhydrous hydrazine (CAS# 302-01-2) are listed as Extremely Hazardous Substances (EHS). Quantities of anhydrous hydrazine or monomethyl hydrazine exceeding the planning thresholds of 1,000 pounds and 500 pounds, respectively, are periodically present at Astrotech (i.e., when satellites are being fueled). Therefore, Astrotech is subject to SARA Title III reporting requirements. The reportable quantity for releases is ten pounds for monomethyl hydrazine and one pound for anhydrous hydrazine.

Nitrogen tetroxide, another chemical that is used during satellite fueling at Astrotech, is not on the Section 302 (a) Title III EHS list; however, it is on a list of chemicals, as are anhydrous hydrazine and monomethyl hydrazine, that is regulated by CERCLA. Any facility releasing this chemical into the environment in quantities of ten pounds or more must immediately report the release to the NRC. See Appendix B for a summary of releases of hydrazines and nitrogen oxides reported to the NRC over an eight year period.

Under Section 304 (b) of Title III, facilities having releases of reportable quantities of chemicals listed as EHSs must furnish the following information, to the extent it is known, to the SERC and to a local emergency answering point designated by the LEPC:

- Chemical name or identity
- Presence of the chemical on list of "Extremely Hazardous Substances"
- Quantity released
- Time and duration of release
- Released into air, land, surface water, ground water
- Anticipated acute or chronic health risks
- Medical attention requirements
- Precautions
- Evacuation information
- Name and telephone number of person to be contacted for further information

Astrotech's plan and procedures do not specifically indicate that these items of information are to be furnished when reporting a release.

Inquiries made by the safety evaluation team of the Florida SERC, the LEPC covering Titusville and local emergency planning and response officials, revealed Astrotech management has filed all required reports and is in compliance.